What does the literature tell us about Children with Mathematical Difficulties and Teachers' Attitudes or Instruction Practices?

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Abstract
Understanding of what is children's deficiency about learning mathematics and their negative feelings about themselves in math classrooms may enable us an essential knowledge for comprehending the failure mathematics in elementary school classrooms. This article presents the studies about the children with learning difficulties in mathematics and the relationship between cognitive development and mathematical disability. Also, some studies are about teachers' tasks and behaviors in elementary school mathematics classroom and the teacher's existing or expected role on teaching to children with low-level learning capacity. The review includes an overview of relevant basic researches and theories through clear implications for pedagogy, a discussion of relevant practical research, an examination of some general issues and concerns having important implications in the area.

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Introduction

Realizing the development of children with mathematical difficulties and the role of teacher on their learning are significant for the researchers interested in academic achievement differences and math learning in elementary classrooms. Also, diagnosing of these kinds of children by teachers and definitions of their problems are required for helping these children through making mathematics more meaningful, considerable and desirable for them.

My goal in this article is to highlight key findings from the various researches taken by the researchers in the area of mathematics teaching and learning in elementary school classrooms. Investigation of the literature validates that there is enough empirical research for determining and understanding the standing and need of students with mathematical difficulties (MD). The traditional approaches to studying children with mathematics difficulties (MD) take notice of their performance at a single point in time. But, contemporary approaches consider children's growth trajectory through longitudinal research for understanding learning difficulties (Francis, Shaywitz, Steubing, Shaywitz, and Fletcher, 1994; in Swanson, Harris, and Graham, 2003).

In the present article, although the term "mathematical disabilities" are used sometimes as consistent with the original article, the term "mathematical difficulties" are preferred rather than disabilities. If children have mathematics difficulties, they show low performance (e.g., at or below the 35th percentile) as well as high performance (below average) (Funchs, Funchs, and Prentice, 2004; in Gersten, Jordan, and Flojo, 2005). So, even children have different performances in some areas of mathematics, they may still have difficulties or deficits in others. Geary, Bow-Thomas and Yao's (1992) study about that children with mathematics and reading emphasized that these children counted correctly. and made sense that counting from right-to-left was just as appropriate as the standard left-to-right counting.

Geary et al.'s (2000) study about mathematical difficulties occurring in the different time periods concluded that mathematics difficulties are not stable over time for many children by identifying a group of "variable" children who showed mathematics difficulties on a standardized test in first grade but not in second grade (in Gersten, Jordan, and Flojo, 2005). This result illustrates that mathematics difficulties in a specific topic and grade can be determined by teachers after their assessment based on achievement tests, but teachers cannot label these children as mentally and mathematically deficient to the test results in their grades.

Individual differences should not be ignored by educators. So, teachers' expectations of same average achievement level from all children are not fair. There are some ideas about the reason of difficulties in learning math. According to one of these ideas, children with mathematical difficulties have overall deficient in mathematical proficiency, too. Conservative thought assumes that mathematical learning difficulties are merely come from internal factors. Also the idea assumes that these kinds of children cannot apply theoretical and practical knowledge to new problem situations even moderately. They are inattentive, forgetful, and prone to confusion. Conversely, an alternative view asserts that learning difficulties in mathematics arise from some external factors. In this view, the common characteristics of children with DML (Difficulties in math learning) are not the cause of difficulties but are merely the symptoms of inadequate or developmentally inappropriate instruction (Baroody, 1996). Case studies about the performance of these children included

those labeled SLD (students' learning disability), indicate the importance of instruction by underlying that most such children are instructionally disabled, not cognitively disabled (Baroody, 1987, 1996; Baroody and Ginsburg, 1991; Ginsburg, 1977; in Jordan et al., 2003). This idea is essential for understanding the significance of instruction by teachers and program makers.

Classrooms include many kinds of students having different and mixed abilities. In regular classrooms, mathematics is taught in a highly traditional way to the children with difficulties in learning mathematics. Teachers generally use direct instruction and drill method by regarding the traditional teaching approach or instruction, but this is not enough to help children understand mathematics in classroom. The instruction needs some connection procedures of concepts to each other, to other aspects of mathematics and daily life for making learning meaningful.

Teaching is complex enterprise including student, teacher, physical and affective environment and teachers implement a certain curriculum during this activity. All children in a classroom cannot respond to the curriculum in the same way and at the same level, so individual differences including cognitive development may cause some obstacles during the teaching activities. The studies and theoretical knowledge about working memory, the difference of working memory among the children with and without learning disabilities and cognitive development sustains revealing the related knowledge with children having difficulties on learning math.

This review study exposes many studies highlighting the reasons and situations of mathematical learning difficulties by following the related studies in terms of *working memory*, *cognitive development* and *instruction* viewpoints and gives some implications for educators, program makers and parents.

Children with mathematical difficulties

Although recent test performances shows general improvement in mathematics when it is compared to old test results in countrywide, individual differences in arithmetic are very noticeable, and there is a significant extension of underachievement. According to Mazzocco and Myers (2003), and Desoete et al. (2004), arithmetic is not easy for many children because of the estimation difficulties of the proportion to criteria (in Dowker, 2009). Moreover, since arithmetical thinking involves a wide variety of components, there are many forms and causes of arithmetical difficulty, which may assume different degrees of importance in different tasks and situations (Dowker, 2009).

Working Memory

Although there is still unclear understanding of the relation between working memory and difficulties in executing arithmetical procedures, it is clear that children with MD have some form of working memory deficits (Hitch and McAuley, 1991; McLean and Hitch, 1999; Siegel and Ryan, 1989: Swanson, 1993 in Geary, 2004). Many studies claim that children with mathematical difficulties have a problem with their working memory. Working memory involves the concurrent storage and manipulation of the information necessary to perform mental tasks. Arithmetic performance is accepted as parallel with measures of working memory (Ashcraft, Donley, Halas, and Vakali, 1992; Logie, Gilhooly and Wynn, 1994;

McLean and Hitch, 1999; Siegel and Ryan, 1989; in Mabbott and Bisanz, 2008). Children with mathematical learning difficulties demonstrate poor working memory skills relative to typically achieving, age-matched peers (Geary, 1990; Geary et al., 1991; Geary et al., 2000; Geary et al., 2004; Hitch and McAuley, 1991; Siegel and Ryan, 1989; Swanson, 1993, 1994; Swanson and Sachse-Lee, 2001; Wilson and Swanson, 2001; Van der Sluis, Van der Leij, and De Jong, 2005; in Mabbott and Bisanz, 2008).

Working memory has been implicated as a central deficit for mathematical disability children. Passolunghi and Siegel (2004) studied on working memory and accessing to numerical information of children with mathematical difficulties in order to understand the cognitive mechanism, which may cause to impaired working memory of children having difficulties with math.

Likewise Keeler and Swanson (2001) worked on the relationship among strategy knowledge, working memory and children's mathematics performance. According to their results, the stability of strategy choice is related to "working memory" performance and has implications on mathematics performance. Additionally, selection of expert strategies in learning has a significant influence on working memory. Geary's (1990) research affirms the different characteristic of children with MD and normally achieving on calculations strategies. According to the study, first grades with MD used the same types of calculation strategies (e.g., direct retrieval, counting with fingers, and verbal counting without fingers) as normally achieving children, but they made more retrieval and computational errors and employed less mature calculation strategies (Jordan, Hanich, and Uberti, 2003).

Keeler and Swanson's (2001) results are consistent with Passolunghi and Siegel's (2004) study, in which they found that children with specific mathematical difficulties have persistent deficit in working memory, which is not restricted to a numerical working memory task. They concluded that children with difficulties in mathematics were not impaired in the speech rate and in counting speed task. The working memory impairment in these kinds of children is related to inhibitory processes. Siegel and Ryan (1989) found that the performance in children with a mathematical learning disability is impaired only a working memory task requiring processing of numerical information. However, Swanson and Sachse-Lee's (2001) interests are based on the relationship between working memory and mathematics performance. Their results show that the difference between poor achievers and good achievers in mathematics is related to both general and verbal working memory. They think that a child's strategy using capacity is obvious evidence of this child's difficulties with mathematics.

A child needs to develop some cognitive strategies in order to understand and apply math. Much of the researches on children with MD (mathematical difficulties) have narrowly focused on a single domain of mathematical behavior (e.g., number combinations). However, different aspects of mathematics require different cognitive skills (Carroll, 1996; Jordan et al., 1992) and mathematics difficulties may not be consistent across domains (Ginsburg, 1997) (in Jordan, Hanich, and Uberti, 2003).

Cognitive Development

Cognitive development is a kind of adaptation process to its environment. In order to determine the most effective way of teaching mathematical structures to children Bruner (1966) studied on mathematical structures and children's cognitive development. In relation to his study, mathematical structures can be built up in the minds of learners by providing experiences allowing them to develop enactive, iconic, and symbolic representation of concepts (in Tall, D., 2004). As consistent with these results, Geary (2004) concluded that most of the children with MD appear to have nearly average number processing skills, at least for the processing of simple numbers (e.g., 3,6), but they showed persistent deficits in some areas of arithmetic and counting knowledge. Many of these children have an immature understanding of certain counting principles and, with respect to arithmetic, use problem solving procedures that are more commonly used by younger, typically achieving children. They also frequently commit procedural errors.

Determining what students know and how they think about mathematical concepts is a critical element for advancing children's thinking. Teachers use elicitation techniques to promote and manage classroom interactions, teaching goals. Analyzing and comparing are additional means of extending students' mathematical thinking. The development of classroom climates in terms of conductive support of student explanations and extension of student thinking without establishing classroom norms is clearly a time-consuming endeavor and it requires great patience, sensitivity, knowledge, and skill on the part of the teacher. Fraivillig et al. (1999) supported this idea by emphasizing the requirement of teacher knowledge about both mathematics teaching and children's mathematical thinking for establishing classroom norms with the purpose of children's development conceptual understanding of mathematics.

Fraivillig, Murphy, and Fuson's (1999) efforts to describe a pedagogical framework that supports children's development and conceptual understanding of mathematics are remarkable. They emphasized teacher's role to advance children's mathematical thinking in inquiry-based mathematics classrooms without undermining children's intellectual autonomy as describing a pedagogical framework. Dienes (1971) called the concrete materials and their contribution to children's experiences as "learning cycle" and supported the importance of it for learning math (in Baroody and Dowker, 2003). He emphasized that structural concepts are discovered and refined as children engage in guided manipulations of materials that physically embody the concepts in several forms.

Many of the studies searching for children with mathematical difficulties consider cognitive profiles and development of these children. Extensively, Kroesbergen, Johannes and Naglieri (2003) took our attention on students with mathematical learning disabilities and the cognitive profiles exhibiting different PASS in their study. In their studies, they concluded that students with learning difficulties in the authorization of basic facts have problems with successive planning, processing, and attention. More of the children having mathematical difficulties are not good at planning or successive processing due to their cognitive weakness. As asserted by Jordan et al. (2003), these children also showed no interest to word problems. They argue that a child's ability to solve nonverbal calculation problems develops before his ability to solve conventional verbal calculations and cognitive ability differences orient children's performance on verbal and nonverbal calculation tasks. Children with MLD have deficits in a wide range of basic mathematical domains including a delayed understanding of counting concepts (Geary, Bow-Thomas and Yao, 1992), difficulties remembering arithmetic facts (Geary, 1993; Jordan, Hanich, and Kaplan, 2003; Jordan and Montani, 1997), and poor

conceptual knowledge of rational numbers (Mazzocco and Devlin, in press; in Geary et al., 2008).

Desoete and Roeyers' (2002) viewpoints about cognitive development focused on meta-cognition, intelligence and mathematics relationships for understanding the role of cognitive profiles on occurring mathematical difficulties. The study supported the use of meta-cognitive assessment procedure to differentiate the students with and without mathematics learning disabilities. They defined "meta-cognitive knowledge" as the knowledge, awareness, and deeper understanding of one's own cognitive process and products. As consistently, in their study Megan and Kazemi (2001) described distinguishing characteristics of learning with understanding in terms of its generative feature, rich knowledge structure, connections and the power of learners' their own inquiry requirements.

As regarding the effects of cognitive process of children, Carpenter, Moser, and Romberg (1982) asserted the role of meaning and understanding in the acquisition of computational skill by connecting the semantic and computational knowledge. Semantic knowledge has potential for incrementing and decrementing moves. Constraints that are part of the semantic knowledge would also serve to block possible incorrect process that children might generate. They emphasized the importance and utility of instruction type that explicitly links to semantic and syntactic knowledge for the children having difficulty learning or remembering the rules for written arithmetic. In addition, the positive effects of initial instruction expressing the semantic properties of the addition and subtraction algorithms help block the obstacles and buggy routines that may arise later.

As consistent with Moser and Romberg's (1982) proposals, Jordan, Hanich and Uberti (2003) were interested in mathematical thinking of children as they worked in groups, learning to add and subtract horizontal four-digit symbolic expression using base-ten blocks and written marks. In their study, children easily established relations among blocks, English words, and written marks at pre addition phase. Necessary pre addition skills, such as counting blocks, copying the expression and written digits, rarely caused difficulty, except that some magic-pad records were quiet messy and difficult to read. Children's descriptions or explanations that used block words or multiunit names often facilitated correcting erroneous methods. They also stressed the role of teaching tools such as using cooperative learning groups and carefully and thoughtfully selective manipulatives promoting conceptual learning. Regarding the group work and cognitive development relation, Resnick and Ford (1981) studied to see how children understand the complex mathematical concepts. According to their results, understanding grouping notions in general may make easier to understand different base systems in math.

Carpenter et al. (1982) focused on the meaning and understanding in the acquisition of computational skill. They claim the instruction that explicitly links to semantic and syntactic knowledge for the children having difficulties with learning and remembering the rules for written arithmetic. They also point out the significance of initial instruction including properties of the addition and subtraction algorithms and mention that instructing about the properties may help block the difficulties and buggy routines that might arise later.

All these researches illustrate that there is incontestable relationships between conceptual understanding and practicing of math and learners' cognitive development. Subsequently, the focus of illuminating children with mathematics difficulties is on the deficiency or lack of cognition's working properly.

Teaching to Children with Mathematical Difficulties

Focusing on students' mathematical thinking requires a powerful method for bringing pedagogy, mathematics and student understanding together. Sometimes teachers struggle to make sense of their students' thinking. In this time, they may engage in practical inquiry and elaborate how problems are posed, questions are asked, interactions occur, mathematical goals accomplished, and learning develops.

Many elementary school and kindergarten have children with different academic levels and abilities. That is, while some children can learn very fast and implement their knowledge in an efficient way, some others' learning process could take longer time and need more effort by teacher. By considering the mixed level classrooms, some researchers focused on instruction type and teachers' tasks in elementary math classrooms. Carpenter, Moser and Romberg (1982) were interested in the influence of traditional instruction on children to an understanding of the intrinsic bases of the skills. At the end of the study, they recommended that teachers should determine the origins of concepts first and begin instruction with them in a specific course. And the basic properties of addition having an algebraic structure determine a unique third element as a function. Thus, quantity can be characterized both in terms of the order relation and of a function. Children with mathematical difficulties may have some problems with at least one of these characters or both of them. So, if a teacher has children with MD (mathematical difficulties) in her classroom, she should spend significant portion of time in order to introduce the new topics to children into the world of concrete objects.

On the contrast**,** Megan and Kazemi (2001) asserted the function of *Cognitively Guided Instruction* for teaching and learning of mathematics. They specifically focused on how teacher use this type of instruction in their classrooms and its influences on teacher beliefs and knowledge. From the researchers points of view, knowing the sequence of strategies help teachers create challenging problems for their students' thinking.

From the instruction type perspective, many researchers presented different instructions such as Funchs et al. (2004). They cited *Expanded Schema-Based Transfer Instruction* to promote mathematical problem solving among third-grade students. This instruction type was defined by the researchers as the instruction that explicitly teaches children how superficial features can make problems seem novel without altering the underlying problem types or the required solutions. In their study, the effects of the instruction were not mediated by students' acquiring problem-solving competence although the difficulties associated with effecting transfer and mathematical problem solving with low-achieving students.

Ebmeier (1979) also studied on the instructional effects against the background of student aptitude and teacher styles. He found that the student probably benefits most from the increased practice and review session, while the teacher benefits from the increased direction that comes from greater organization. Low achievers do best with type two teachers (experienced/unsure) in the experimental treatment again seems to support the idea of matching student-teacher characteristics for optimal growth. The study offered convincing evidence that interaction between student types, teacher types and treatment types exert influence on students' mathematics achievement. As a result, direct instruction generally has effect increasing student mathematics achievement.

Student performance is enhanced on a complex, real-life, problem-solving task when instruction addresses additional and more challenging transfer features designed to effect broader schemas for recognizing mathematical problems as familiar. However, growing numbers of students with difficulties are receiving instruction in general education classrooms.

Implementing the mathematical skills to novel problems is required for mathematical problem solving. In conjunction with problem solving performance of students as connected to the problem types, Kercood, Zentall, and Lee (2004) took our attention on the categorization of math problems to increase the math problem solving performance of students with and without deficit disorder. Although their results are not surprisingly, they would be valuable for mathematical disability children. The students in the study, who were given advanced notice of particular features of math problems, identified those features more easily and faster than students who were asked to generate the features of math problems on their own. When these students were required to form their own categories, they took longer on the subsequent problem-solving task than students who were earlier provided with a schema of categorization by the examiner. During the execution of these tasks by students, processing time was offset by improved solving accuracy tendency.

The citations have informed readers about some specific learning and instruction methods so far. Linchevski and Kutscher's (1998) work have altered my consideration to the effect of classroom setting on students' academic achievements and teachers' attitudes. For understanding a mixed-ability classroom setting Linchevski and Kutscher (1998) were interested in a gap between high-ability and low-ability students and the reasons of different teacher attitudes. They think that mathematics teachers can develop positive attitudes toward teaching in mixed-ability classes if they teach mathematics in heterogeneous settings. In the study, all teachers felt that their success was to some extent dependent on continual support of a workshop type of framework. Also, it is possible for students of all ability levels to learn mathematics effectively in a heterogeneous class, to the satisfaction of the teacher.

A symbolic relationship would develop between a non-defensive teacher in teaching math and a student who needs teacher support. Resnick and Ford (1981) were interested in this teaching issue from a holistic perspective. As well as children's understanding and use of complex mathematical concepts, they were keen on to find the best way to teach children the basic concepts and principles of mathematics. To their findings, the teaching sequence from concrete to increasingly symbolic representations gives the children an intuitive understanding of the mathematical standardized realities. They assume that if one is not interested in teaching the mathematical structure underlying the notation, then one might just teach children to read numbers by rote. The structures of mathematics may be thought in an intellectually honest way at an early age by presenting them in concrete form, especially in the form of math materials that physically embody those structures.

Many of the studies about teaching to students with mathematical difficulties emphasize the importance of teaching style, strategies and support of teacher. Consequently, elementary math curriculum is not just consisting of the aims and educational attainments. But it is the teacher practicing in classrooms.

Mathematical Difficulties in Educational Policy

More than 30 % of students in school today have significant difficulties learning math, in spite of normal or above-normal intelligence. A wide range of observed problems or "symptoms" in this group of students leads educators to propose that there were a number of different types of math learning difficulties (http://www.mathlearningdifficulties.com).

Taking into account this considerable amount of students, teaching programs in math classrooms should assist students to overcome an increasing amount of mathematical information. Munro (2003) assumes that once a mathematics procedure has been learnt, it is not good to apply the same procedure across a range of numbers, because teaching provide the opportunity for students to manipulate each capacity in an attention demanding way initially and then to gradually automatize it. Therefore, it is very important to construct special teaching programs for these kinds of children.

The constitution of this kind of programs is totally based on the educational policy and its philosophy about what kind of human we should educate for our nation. Before shaping an educational policy the former educational policy should be described, the results of applied prior educational policy and its halting points should be examined for better educational outcomes.

Inarguably, a nation's educational policy consists of the political system of the nation, but they are not the same things. Barely, political system can be used as a tool for creating the educational system. In this situation, if the relationship between peoples' success and their understanding in math and their working potential in daily life is important for the political system, then it is inevitable to consider this issue in educational policy. In this consideration, political and educational systems should be reconciliatory to each other and to other institutions.

In Turkey's education committee working for OECD are highlighted some basic points, which equilibrate the economic and educational situations in the state. These points are improving the linkage between life-long learning and other socio-economic politics, analyzing the educational politics and their implementation, examination of the national education politics, encouraging a quality education, reevaluating higher education in global economy perspective and being attuned to society by means of education (OECD, 2008). When the subjects are inspected, it can be seen that educational politics and their implementation are the heavy topics. The most important one among the subjects is that the effort of connection between socio-economic politics and education programs. But it is not clear and underlying to consider the students with learning difficulties.

Why an educational policy important for the issue of children with mathematical difficulties can be explained with its power of influence on individuals' lives directly. For example, educational attainments acquired in schools affect the society. Therefore, students' graduate with lack of basic mathematical knowledge and skills most likely affect the work performance of social and state institutions. If a person cannot subitize the objects, which is the first arithmetic skill belong to human naturally, count, make connections between number magnitudes and be able to subtract numbers by counting between them, it is very possible to not to do any work using money, technology, numbers etc. Children can learn subsequent arithmetic skills, such as division, multiplication and fractions at basic level from the adults in their society since these skills become largely cultural. That is, the society's influence on children is obvious. Olsen (1987) pointed out that mathematics as a field of knowledge

comprising powerful knowledge and a field of knowledge is important knowledge is not only for the benefit of industry or technology, but also it is important knowledge for the individual pupil. Therefore, first of all children should exploit mathematics knowledge for themselves, for their benefits from the society and for their status in that society.

Although the society's serious effect, the amendments in educational policy take effect on the society after a long years. The producers of educational policy take decisions extracted from daily facts and events without probing enough even though their effects can be seen after a long time. Accordingly, even the policymakers take wrong decisions; they do not pay a price for these decisions because after a long time any body does not these people.

It is considered that the revised studies in this article generally focus on the inadequacies in math teaching, incapacities in abstract thinking of students when they come across the abstract subjects, inadequacies at interpreting verbal expressions in mathematical problems and the teachers' repeating practices of learning subjects and the problem solving stages. When the reviewed studies are compared, it can be seen that the studies for removing the difficulties students come across during the math learning are considerably less than the studies for determining these difficulties.

Discussion

My goal in this article is to highlight key findings from the diverse approaches taken by the researchers in the area of mathematics learning of students with mathematics difficulties. In particular, I present what we know about (a) the relation between cognitive development and mathematical difficulties (b) the role of working memory in children on deficient of working memory (c) and the role of instruction on the children having difficulties on learning mathematics.

The general notion in the literature about the children with mathematical difficulties centers the links between semantic knowledge and cognitive structure. The cognitive structure overlaps with working memory and processing of brain such as attention, perception, understanding the episode or problem and trying to go to the result. Also children's verbal and nonverbal or numeric development is different in cognitive ability. But the cognitive profiles generally are evaluated to exhibition of some standard strategies by children such as planning, attention and processing, not to children's individual differences. So, exploring that if children use these strategies help teachers understand whether there are some children with mathematical difficulties in their classrooms.

In this paper, teachers' teaching style, responsibilities and tasks for children with MD are reviewed by considering the relevant literature. The literature generally focuses on pedagogical framework that supports children's development of conceptual understanding of mathematics. However, it is not easy to adapt this framework to classrooms. Therefore, teachers need to be educated about recognizing and working with children with MD both theoretically and practically.

Math teaching includes the teaching of basic mathematics concepts, principles and practicing them. Additionally, the teaching sequence of topic is important since it could be helpful instruction of math to the children with or without learning disabilities.

Teacher attitudes to children with learning difficulties in classroom settings might be the limitations of many studies, because attitude variable causes to get different results at different situations. The studies about children with learning difficulties generally focus on the children's relationships with their friends during their learning process.

Furthermore, some studies take into consideration one or two certain theories about development of mathematical knowledge in brain. For example; While Sweller and Reena (1992) consider schematic acquisition and schema knowledge, Resnick and Ford (1981) talk about Gestalt psychology and Gestalt explanations of problem solving. But, if they couldn't have considered those theories; their results would have been different. So, studies, which were performed around a theory, could be the limitation of the review to understand the relationship between the learning difficulties of children and their teacher.

Conclusion

The research agendas and book chapters discussed in this review underline that children with mathematical difficulties should be taken into consideration by teachers in math classrooms, because teachers can help them and alter their learning by an accurate instructional way.

The study emphasizes the common inadequacies in practicing math teaching, insufficiencies of children with mathematical learning difficulties in understanding the elusive subjects and in interpreting the verbal expressions. Principally, the studies focus on determining the difficulties in math learning instead of removing them. In these kinds of studies, teachers' time spent portion for introducing the new topics to children into the world of concrete objects, their teaching methods and the importance of repetition during the teaching are the recommended subjects for removing the difficulties.

Children have some mathematical knowledge before coming into the school and may be interested in some mathematical aspects of their environment. Their mathematical interests shift to teacher's behavior in math classroom and their attitudes to children with mathematical difficulties. The significance of informal experiences and formal instruction on children with learning difficulties is inevitable for their learning. The studies generally mention organic deficiencies related to mathematical difficulties in working memory section. Cognitive development section includes many different views about learning and assessing it.

A major goal of early mathematics interventions focuses on the proficiency with basic arithmetic combinations and efficient use of counting strategies. According to Gersten et al. (2005), the fast retrieval of arithmetic combinations is critical because the students with MD cannot comprehend any type of dialogue about number concepts or different problem solving approaches unless they automatically know some shortcuts such as 6 + 4 is 10, doubling 8 makes 16, and so forth. Therefore, it can be argued that the fluency on arithmetic combinations and problems is an important criterion for determining children with MD and needs to be working on developing this criterion by some intervention efforts for many children. The efforts should be made by teachers for picking out the students having not mastered basic arithmetic combinations. They also should know that these students may need more time than the students'requiring, who have mastered the combination to understand the concepts and operations of basic arithmetic. Since children's use of calculation strategies on different problems may affirm their cognitive competences, one of the teachers' tasks is to determine whether children can make this transition.

This review includes some process such as annotating any article, reviewing the related resources, and combining those similar or different ideas on a paper by emphasizing the difference between theoretical, empirical and polemical articles. The future studies generally should focus on children's performance on cognitive tasks that are directly applicable to mathematics education examining adaptive expertise and flexibility based on these empirical and theoretical studies. It is expected that the study would provide a theoretical basis for developing instructional and assessment activities aimed at improving instruction before their difficulties.

Additionally, educational policy needs to consider children with some difficulties in math and other fields since the effect of deficiencies in this field on society.

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